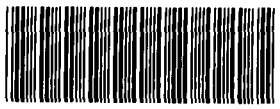
4B300



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RMRS Rocky Mountain Remediation Services, L L C
protecting the environment

Rocky Flats Environmental Technology Site
P O Box 464
Golden Colorado 80402-0464
Phone (303) 966-2678
Fax (303) 966 8244

February 12, 1996 96-RM-TA0030-KH

Karan North, Division Manager
Compliance and Performance Assurance
Kaiser-Hill Company, L L C , T130C

SUBJECT TREATABILITY STUDY ANNUAL REPORT - CCJ-035-96

ACTION Forward Treatability Study Annual Report To Department of Energy (DOE) for Transmittal To The Colorado Department of Public Health and Environment (CDPH&E)

Attn K G. Peter

Enclosed is a draft letter to the Colorado Department of Public Health and Environment (CDPHE) and a draft letter to DOE, which transmits the information for complying with the annual reporting requirements of the Treatability Study exemption regulations contained within 6 CCR, Section 261 4(f)(10)

Submittal of this report to DOE completes external milestone number 621 in Work Package 13801

If you have any questions or require additional information, please contact Frank Walker at extension 6250

Candice Jierree, Vice President
RMRS/TA

FAW vlo

Attachments
1) Draft Letter to DOE
2) Draft Letter to CDPHE
3) Treatability Study Annual Report

cc w/o attachment
G R Konwinski - RMRS (T130F)
K G Peter - K-H (T130C)

cc w/attachment
F A. Walker - RMRS (T130C)

Correspondence Control - RMRS (T130F)
File (T130F)

Y 14

DRAFT DRAFT DRAFT

Steven Tower
Environmental Assessment Group
DOE, RFFO

Attn: David Maxwell

TREATABILITY STUDY ANNUAL REPORT - KN-XXX-96

Enclosed is a draft letter to the Colorado Department of Public Health and Environment (CDPHE) which transmits the information for complying with the annual reporting requirements of the Treatability Study exemption regulations contained within 6 CCR, Section 261.4(f)(10). This information must be provided to CDPHE no later than March 15, 1996.

If you have any questions or require additional information, please contact Kyle Peter at extension 7752.

Karan North, Division Manager
Compliance & Performance Assurance
Kaiser-Hill company, L.L.C

Orig. and 1 cc - Steven Tower

Enclosures:
1) Draft letter to CDPHE
2) Treatability Study Annual Report

cc w/enclosures
K. W. Ticknor - RMRS
F A. Walker - RMRS

cc: w/o enclosures
K. G. Peter

2

DRAFT DRAFT DRAFT

Attachment 2
96-RM-XXXX-KH
Page 1 of 1

Mr. Joe Schieffelen, Unit Leader
Colorado Department of Public Health & Environment
4300 E. Cherry Creek South Drive
Denver, Colorado 80222-1530

Dear Mr. Schieffelin:

The United States Department of Energy is submitting the enclosed Annual Report of Treatability Studies for the Rocky Flats Environmental Technology Site in accordance with the Colorado Hazardous Waste Regulations 6 CCR, Section 261.4 (f)(10)

Should you have any questions, please contact David Maxwell at 966-4017.

Enclosure.
1) Annual Reporting Requirement for Treatability Studies

cc: w/enclosure
S. Tower - DOE, RFFO
D. Maxwell - DOE, RFFO
K. G. Peter - Kaiser-Hill
F A. Walker - RMRS

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ANNUAL REPORT - TREATABILITY STUDIES

In accordance with 6 CCR, Section 261.4(f)(10), the following information is provided for Treatability Studies at the Rocky Flats Environmental Technology Site

1. **Estimate the number of studies and the amount of waste expected to be used in treatability studies during the calendar year 1996.**

   Eleven technologies performing a total of 63 treatability studies, involving a total of 60,993 kg of hazardous wastes are scheduled for calendar year (CY) 1996.

   a) Polyethylene macroencapsulation of debris:

Filter media	1,200 kg
Leaded drybox gloves, acid contaminated	2,500 kg
Insulation	1,200 kg
Used absorbent	1,200 kg
Dry combustibles	1,200 kg
Glovebox parts with lead	2,500 kg
Leaded glass	2,500 kg
Wet combustibles	1,200 kg
Leaded drybox gloves, not acid contaminated	2,500 kg
LLM plastic	1,200 kg
Glass	1,200 kg
Light metal	1,200 kg
Wet LLM combustibles	1,200 kg
Ground glass	1,200 kg
Heavy non-SS metal	2,500 kg

   In addition, to the above waste forms, the polyethylene macroencapsulation work will be completed on the lead treatability studies begun in CY-95. 950 kg

   subtotal 25,450 kg

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b) Thermoset resin macroencapsulation of debris

Filter media	1,200 kg
Leaded drybox gloves, acid contaminated	2,500 kg
Insulation	1,200 kg
Used absorbent	1,200 kg
Dry combustibles	1,200 kg
Glovebox parts with lead	2,500 kg
Leaded glass	2,500 kg
Wet combustibles	1,200 kg
Leaded drybox gloves, not acid contaminated	2,500 kg
LLM plastic	1,200 kg
Glass	1,200 kg
Blacktop, concrete, dirt, and sand	2,500 kg
Light metal	1,200 kg
Mixed IDC's outside the PA	1,200 kg
Wet LLM combustibles	1,200 kg
Dry LLM combustibles	1,200 kg
Ground glass	1,200 kg
Heavy non-SS metal	2,500 kg

In addition, to the above waste forms, the thermoset resin macroencapsulation work will be completed on the beryllium contaminated debris and lead treatability studies begun in CY-95

Beryllium contaminated debris	1,500 kg
Lead	865 kg
subtotal	**31,765 kg**

c) Destruction of waste silver nitrate solutions	**1,000 kg**
d) Destruction of excess chemical sulfides and cyanides	**100 kg**
e) UV Oxidation/destruction of excess organic chemicals	**50 kg**
f) Stripping of mercury	
Two drums of crushed lamps (140 kg each)	280 kg
Two drums of mercury contaminated debris (140 kg and 220 kg)	360 kg
subtotal	**640 kg**
g) Polyethylene Microencapsulation of each of the following. (Studies to begin third and fourth quarter CY-96)	
Incinerator ash	15 kg
OU-2 remediation soils	15 kg
Glass & ground glass	15 kg
Excess chemicals	15 kg
OU-5 ash	15 kg
Sludges resulting from pretreatment by precipitation of the following wastes	
Acids	15 kg
Analytical lab solution	15 kg
Silver nitrate	15 kg

In addition, to the above waste forms, the polyethylene microencapsulation work will be completed on treatability studies begun in CY-95 for:

by-pass sludge		18.5 kg
cadmium sludge		0 5 kg
fluid bed incinerator ash		21 kg
	subtotal	**160 kg**

h) Cementation of each of the following:
(Studies to begin third and fourth quarter CY-96)

OU-2 remediation soils		100 kg
Analytical lab solution		100 kg
Glass & ground glass		100 kg
Excess and Reactive chemicals		100 kg
Ion exchange resin		100 kg
	subtotal	**500 kg**

i) Microwave solidification of each of the following.

Filter & oily sludges		60 kg
Various ashes		100 kg
Pyrochemical salts		100 kg
Sand & crucible		60 kg
	subtotal	**320 kg**

j) Low temperature thermal desorption of contaminated oil (offsite TSE) **1000 kg**

k) Calcining of mixed residue ash. **8 kg**

total **60,993 kg**

2. Name, address, and EPA Identification number of the facility conducting the treatability studies:

LOW TEMPERATURE THERMAL DESORPTION TREATABILITY STUDIES
Clemson Technical Center
101 Technology Dr.
Anderson, South Carolina 29625
EPA Identification Number SCD987588084

ALL OTHER TREATABILITY STUDIES
Rocky Flats Environmental Technology Site
P O Box 464
Golden, Colorado 80402-0464
EPA Identification Number CO7890010526

3. The types (by process) of treatability studies conducted during calendar year 1995.

a) Polyethylene macroencapsulation of low-level mixed combustible debris and lead.
b) Thermoset macroencapsulation of low-level mixed lead and beryllium contaminated debris
c) Destruction of cyanides in excess chemicals using an electrochemical chlorination process
d) Stripping mercury from spent fluorescent lamps using a vacuum retort technology.
e) Microwave solidification of OU-2 remediation soils
f) Polyethylene microencapsulation of incinerator ash, by-pass sludge, spray dried salts, and cadmium sludge.
g) Cementation of incinerator ash, by-pass sludge, cadmium sludge, and mercury contaminated fluorescent lamps
h) Low temperature thermal desorption of combustibles, soils & debris, and absorbents

Ce

4. The total quantity of waste in storage each day.

a) Polyethylene macroencapsulation of lead and combustible debris

No waste was "stored" during these studies. The samples were collected, prepared, and treated as a continuous process. The lead treatability study occurred in Building 779, and the combustible debris treatability study was performed in the Tent 5 Permacon on the 750 Pad.

b) Thermoset macroencapsulation of beryllium contaminated debris·

Date	Waste Added (kg)	Waste Treated (kg)	Waste in Storage (kg)
06/27/95	15		15
07/11/95		12	3
08/01/95	182		185
08/15/95		20	165
08/16/95		38	127
09/19/95	312		439
10/11/95		93	346
10/26/95		80	266
11/14/95		22	244

c) Thermoset macroencapsulation of lead:

Date	Waste Added (kg)	Waste Treated (kg)	Waste in Storage (kg)
07/25/95	300		300
08/15/95		56	244
08/16/95		79	165
08/16/95	-165 (returned to storage)		0

d) Cyanide destruction of excess chemicals:

Date	Waste Added	Waste Treated	Waste in Storage
03/06/95	500 grams (g)		500 g
03/06/95		500 g	0
04/07/95	950 milliliters (ml)		950 ml
04/24/95		950 ml	0

e) Mercury stripping of fluorescent lamps

Date	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
07/25/95	26,781		26,781
07/26/95		3,617	23,164
08/15/95	31,751		54,915
09/06/95		2,930	51,985
09/19/95		20,234	31,751

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f) Cementation and polyethylene microencapsulation of fluidized bed incinerator ash

Date	Action	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
02/10/95	Addition	10,561 3		10,561 3
02/13/95	Polyethylene Encapsulation		851 3	9,710 0
02/21/95	Cementation		1,199 0	8,511 0
02/22/95	Cementation		1,200.3	7,310 7
03/08/95	Polyethylene Encapsulation		1,000 0	6,310 7
03/23/95	Polyethylene Encapsulation		835.0	5,475.7
05/03/95	Addition	19,642 5		25,118.2
06/13/95	Polyethylene Encapsulation		3,688 0	21,430 2
06/27/95	Polyethylene Encapsulation		343 7	21,086.5

g) Polyethylene microencapsulation of spray dried salt

Date	Action	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
03/16/95	Addition	5,939 2		5,939 2
04/19/95	Polyethylene Encapsulation		1,306.3	4,632 9
04/25/95	Polyethylene Encapsulation		1,291.8	3,341 1
06/07/95	Polyethylene Encapsulation		1,077.5	2,263 6
08/15/95	Addition	38,886.5		41,150.1
12/21/95	Transfer to RD&D	-41,150.1		0 0

h) Cementation and polyethylene microencapsulation of bypass sludge

Date	Action	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
05/03/95	Addition	26,615 6		26,615 6
07/13/95	Lab Samples for TCLP		529 2	26,086 4
07/17/95	Cementation		1,504 4	24,582 0
07/18/95	Cementation		1,503.6	23,078 4
07/21/95	Polyethylene Encapsulation		500 0	22,578 4
07/25/95	Polyethylene Encapsulation		900 0	21,678 4
07/27/95	Polyethylene Encapsulation		909 3	20,769 1
08/14/95	Cementation		2,100 4	18,668 7
08/17/95	Moisture Balance		25 5	18,643 2
08/22/95	Lab Samples for TCLP		125 3	18,517 9

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i) Cementation and polyethylene microencapsulation of cadmium sludge

Date	Action	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
09/11/95	Addition Bldg. 881	809 0		809.0
09/11/95	Conversion of sludge to sterate		809.0	0 0
09/11/95	Cd Sterate waste returned	2,202.3		2,202 3
09/13/95	Archived 25 g of Cd sterate	-25 0		2,177.3
10/03/95	Shipped Cd sterate to Bldg. 779	-2,177.3		0 0
10/03/95	Addition in Bldg 779	2,177 3		2,177 3
10/04/95	Polyethylene Encapsulation		476.4	1,700.9
10/05/95	Polyethylene Encapsulation		257.2	1,443 7
10/09/95	Polyethylene Encapsulation		290 7	1,153.0
12/05/95	Cementation		619.9	533.1

j) Cementation of non-radioactive mercury contaminated lamps:

Date	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
01/31/95	9,000		9,000
01/31/95		1,800	7,200
02/15/95		500	6,700
08/14/95		1,900	4,800

k) Microwave solidification of OU2 soil.

Date	Waste Added (g)	Waste Treated (g)	Waste in Storage (g)
03/07/95	10,000		10,000
03/08/95		200	9,800
03/14/95		200	9,600
03/14/95		100	9,500
03/15/95		100	9,400
03/15/95		150	9,250
03/16/95		150	9,100
03/20/95		180	8,920
03/20/95		180	8,740
03/27/95	- 8,740		0

l) Low temperature thermal desorption on-site studies:

No waste was "stored" during the combustible study. The samples were generated from radioactive debris that was spiked with the RCRA regulated substances prior to testing

Date	Waste Added (kg)	Waste Treated (kg)	Waste in Storage (g)
03/23/95	867		867
03/27/95		143	724
03/27/95	143 (treated)		867
05/11/95	- 867		0

m) Low temperature thermal desorption off-site studies

Waste was shipped off-site for these treatability studies (59 kg of used absorbents & 96 kg of wet combustibles), therefore, the records are maintained and reported by the testing facility in South Carolina.

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5. **The quantity and types of waste subjected to treatability studies (including dates).**

a) Polyethylene macroencapsulation of combustible debris:

The study was initiated on March 30, 1995, when one 10-gallon sample of low-level mixed combustible debris (7 kg) was successfully encapsulated. A single 55-gallon sample of low-level mixed combustible waste (23 kg) was encapsulated on May 4, 1995 The total amount of waste treated was 30 kilograms

b) Polyethylene macroencapsulation of lead.

The study was initiated on June 6, 1995, when one 10-gallon sample of low-level lead (41.8 kg) was successfully encapsulated.

c) Thermoset macroencapsulation of beryllium contaminated debris:

The study was initiated on June 27, 1995, with receipt of 15 kg of beryllium contaminated debris. The first run of 12 kg was on July 11, 1995. An additional 182 kg of debris was added on August 1, 1995. Two runs were completed in August: 20 kg on August 15, 1995, and 38 kg on August 16, 1995 On September 19, 1995, 312 kg were delivered to the treatability study unit. The next two runs involved a debris mix with a higher density. These runs were performed on October 11, 1995, (93.02 kg) and on October 26, 1995, (79.97 kg). The last run in CY-95 involved 22.2 kg and was run on November 14, 1995. Further study will occur in CY-96

d) Thermoset macroencapsulation of lead:

The study was initiated on July 25, 1995, with receipt of 300 kg of lead. The first run of 56 kg occurred on August 15, 1995 with a second run of 79 kg performed on August 16, 1995 The remainder of the lead was removed from this study as no further tests for this type of lead (non-PA generated lead bricks) were planned.

e) Cyanide destruction·

The study was initiated on March 6, 1995, with delivery of 500 grams of potassium cyanide salt. The first test run was started that same day (March 6) and continued through March 13, 1995. The residual solution was retained as the basis for a second test run. A silver electrolyte solution (950 milliliters) was received on April 7, 1995, for the second run. This run was started on April 24, 1995, and completed April 27, 1995

f) Mercury stripping:

The study was initiated on July 25, 1995, with delivery of 26.8 kilograms of crushed fluorescent lamps The first test run was performed on July 26, 1995, and treated 3 6 kilograms of waste Another shipment of 31 7 kilograms of fluorescent lamps was received on August 15, 1995. A second test run consisting of 2.9 kilograms of waste was performed on September 6, 1995 A third test run on the spent fluorescent lamps was completed on September 19, 1995, and treated 20 2 kilograms of waste

g) Polyethylene microencapsulation of fluidized bed incinerator ash

On February 10, 1995 the study began with receipt of the waste Waste samples of coarse material were encapsulated on February 13, 1995, at 40 % waste by weight in low density polyethylene (LDPE) Waste samples of the coarse material were extruded on March 8, 1995, at 30 % waste by weight in LDPE On March 23, 1995, waste samples of fine material were extruded at 20, 30 and 40 % waste by weight in LDPE Waste samples of the fine material were extruded with 30, 40 and 50 % waste by weight in LDPE on June 13, 1995 On June 27, 1995 waste samples of fine material were encapsulated at 40% waste by weight in LDPE with different extruder temperature profiles

h) Polyethylene microencapsulation of spray dried salt:

The waste was received in Building 779 on March 16, 1995. On April 19, 1995, samples of waste were extruded at 20, 40 and 50 % waste by weight in LDPE. The waste was extruded at 35, 40, 45, 50 and 55 % waste by weight in LDPE on April 25, 1995 A lower density polyethylene (LLDPE) was substituted for LDPE in tests on June 7, 1995, at 50 % by weight waste. The remainder of the salt has been transferred to the RD&D project scheduled for CY-96

i) Polyethylene microencapsulation of bypass sludge:

Personnel in Building 779 received the waste on May 3, 1995. On July 21, 1995, the waste was extruded in LDPE at 30, 40 and 50 % by weight. More samples under the same conditions were extruded on July 25, 1995, and July 27, 1995

j) Polyethylene microencapsulation of cadmium sludge

The cadmium sludge under went a pretreatment (in Building 881) due to the concentration of cadmium This treatment consisted of converting the sludge into cadmium sterate on September 11, 1995 Twenty five grams of the cadmium sterate were archived in building 881(incase further pretreatment studies are required), the remaining cadmium sterate was sent to Building 779 on October 3, 1995 The cadmium sterate was shared with the cementation treatability studies Samples were first extruded on October 4, 1995, at 20 and 30 % waste by weight in LDPE More samples were extruded on October 5, 1995, while drawing a vacuum and October 9, 1995, at higher extruder speeds Additional tests are needed as the first samples did not pass TCLP

k) Cementation of fluidized bed incinerator ash

Fluidized bed incinerator ash was received in Building 779 on February 10, 1995, and was shared with the polyethylene encapsulation treatability study Cementation samples, both with and without fly ash, were mixed with 20 % by weight of the coarse ash on February 21, 1995 On February 22, 1995, samples both with and without fly ash, were mixed with 20% by weight of the fine fluidized bed incinerator ash

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l) Cementation of bypass sludge

On May 3, 1995, the bypass sludge was received in Building 779 to be shared with the polyethylene encapsulation treatability study Samples with 20 and 30 % waste by weight were mixed with cement and water on July 17, 1995 On July 18, 1995, samples with 20 and 30 % waste by weight were mixed with cement, water and fly ash Samples of ash from a different drum were mixed at 30 and 40 % waste by weight with cement, water and fly ash on August 14, 1995

m) Cementation of cadmium sludge

Cadmium sludge was received on October 3, 1995, to be shared with the polyethylene encapsulation treatability study Four different sets of samples were mixed together on December 5, 1995. The four samples were mixed, both with and without fly ash, and at 20 and 30 % waste by weight in water and cement.

n) Microwave solidification of OU2 soil

Ten kg of OU2 soil was received on March 7, 1995 A series of eight melts were performed to generate samples for analysis The first run of 200 g occurred on March 8, 1995. The next two samples (200 g & 100 g) were generated on March 14, 1995 Two more samples (100 g & 150 g) were run on March 15, 1995 with an additional sample of 150 g on March 16, 1995 Two final samples of 180 g each were run on March 20, 1995

o) Low Temperature Thermal Desorption of Soils and Cleanup Debris

The treatability study began with receipt of the OU2 soil on March 23, 1995 On March 27, 1995, 143 kg was treated

p) Low Temperature Thermal Desorption of Combustible Debris

The treatability study began on March 21, 1995 All combustible waste used in this study was created by spiking the radioactive combustible debris generated within the permacon with commonly found solvents i e carbon tetrachloride, toluene, and trichloroethylene The first run of 3 75 kg of combustibles was performed on March 21, 1995 Four additional runs of 3 75 kg each occurred on April 11, 13, 19, & 20, 1995

6. The final disposition of residues and unused samples from each treatability study.

a) Polyethylene macroencapsulation

All waste generated during these studies was consumed in the treatability study for combustible debris and lead No unused samples resulted from these studies After treatment, the encapsulated samples were visually inspected, photographed, and are being stored in the treatability study areas The lead sample is currently archived in Building 779 Arrangements are in process to add the combustible debris samples into the waste inventory by placing the treated waste into permitted waste storage in Interim Status storage unit 25

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b) Thermoset resin macroencapsulation

All waste generated during these studies is or was consumed in the treatability studies After conclusion of the studies the encapsulated samples (lead and Beryllium contaminated debris) will be visually inspected, photographed, and placed in permitted storage The samples are currently being stored in the treatability study area.

c) Cyanide destruction

No unused samples resulted from this study After treatment, the residual solutions were verified to be below treatment standards for total and amenable cyanides The residual solutions were then transferred to the Building 374 Liquid Waste Treatment Facility for final treatment (immobilization) on June 21, 1995

d) Mercury stripping

Treated samples were verified as being below the Universal Treatment Standard for "mercury - non-waste water from retort" and have been classified as straight low level waste. This material is being stored in the treatability study area. Untreated waste remains in storage at the study site awaiting final report generation and a determination of need for continuing the treatability study

e) Polyethylene microencapsulation

Polyethylene run-out generated during cleanup of the extruder has been placed in satellite accumulation area 779-2238 When the drum is full it will go to 90-day storage area 799-1630 The treatability studies, with the exception of nitrate salts waste form, are overlapping into CY-96, and therefore, the remainder of the untreated waste forms are in the treatability study area for polyethylene microencapsulation in room 270, Building 779 The remainder of the nitrate salts is being reassigned to the RD&D effort that will begin in calendar year 1996

f) Cementation

Moist combustibles generated during cleanup of the treatability studies has been placed in satellite accumulation area 779-2232 When the drum is full it will go to 90-day storage area 799-1630 To minimize the amount of waste taken out of storage for studies the cement and polyethylene microencapsulation studies shared the source of untreated waste, therefore, all non-used waste from cementation studies is included in the total quantity in storage for the polyethylene studies

g) Microwave

All waste generated during this study was consumed in the treatability study for polyethylene macroencapsulation of combustible debris All remaining OU2 remediation soil was placed in storage at Interim Status Unit 25 on March 27, 1995

h) Low temperature thermal desorption

All waste generated during these on-site studies was consumed in the treatability study for combustible debris The soil waste not used was returned along with the treated soil on May 11, 1995, to OU2 storage (551 Pad) The combustibles were determined to be non-hazardous and were placed in a straight low-level combustibles crate generated on the 904 pad

For the waste sent off-site, the treated waste forms will be returned to Rocky Flats at the conclusion of the treatability studies A waste classification determination will be made upon receipt at Rocky Flats

7. A summary of spills or releases of waste material to the environment.

None to report.